Symbol Technologies WS 2000 with AP 300
VIEW Pre-Certified Configuration and Deployment Guide

SpectraLink's Voice Interoperability for Enterprise Wireless (VIEW) Certification Program is designed to ensure interoperability and high performance between NetLink Wireless Telephones and WLAN infrastructure products.

The products listed below have been thoroughly tested in Symbol Technologies' lab using the VIEW Pre-Certification Test Plan. This document details how to configure the WS 2000 Wireless Switch and the AP 300 access point (AP) with NetLink Wireless Telephones.

Product Summary

Manufacturer:	Symbol Technologies: http://www.symbol.com/products/wireless/ws2000_brochure.html	
Approved products:	Wireless Switch	Access Point
	WS 2000†	AP 300†
RF technology:	802.11b/g	
Radio frequency:	2.4 – 2.484 GHz	
Quality of Service:	SpectraLink Voice Priority (SVP)	
Security:	WPA-TKIP (PSK), WPA2-CCMP (PSK)	
Wireless Switch firmware version tested:	2.1.1.0-009R	
NetLink Wireless Telephone software version tested:	89.127	
Maximum telephone calls per AP:	8	
Recommended network topology:	Switched Ethernet	

† Denotes products directly used in Pre-Certification Testing

Service Information

If you encounter difficulties or have questions regarding the configuration process, please contact Symbol Technologies technical support at (800) 653-5350, or at http://www.symbol.com/services/contactsupport.

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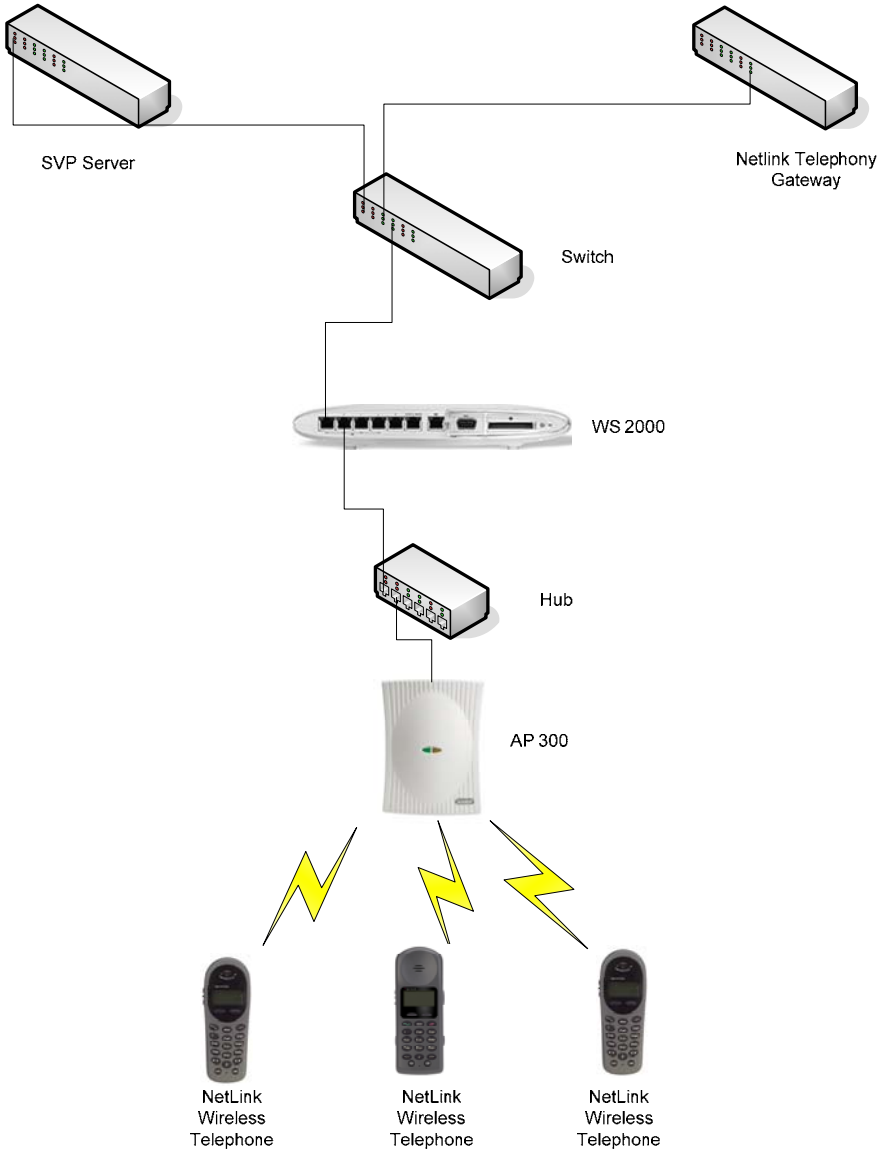
Network Topology

The following topology was used during VIEW Pre-Certification testing.



Configuration Settings

Installing a New Image

The VIEW Pre-Certified firmware release can be obtained from Symbol Technologies 'Dev Zone'. Upgrading the WS 2000 Wireless Switch to the new firmware can be done through the Web interface or through the command line interface (CLI). Place the image on the FTP server, TFTP server or through Compact Flash card, depending on the file transfer mechanism chosen.

Installing Firmware through the CLI

1. Enter your username and password to log into the CLI.
2. Connect the FTP/TFTP server to subnet 1.
   a. For TFTP, issue the following commands.

```
admin>
admin>system
admin(system)>config
admin(system.config)>set server 192.168.0.100
admin(system.config)>set fw file mf_02010100009R.bin
admin(system.config)>update tftp s1
```

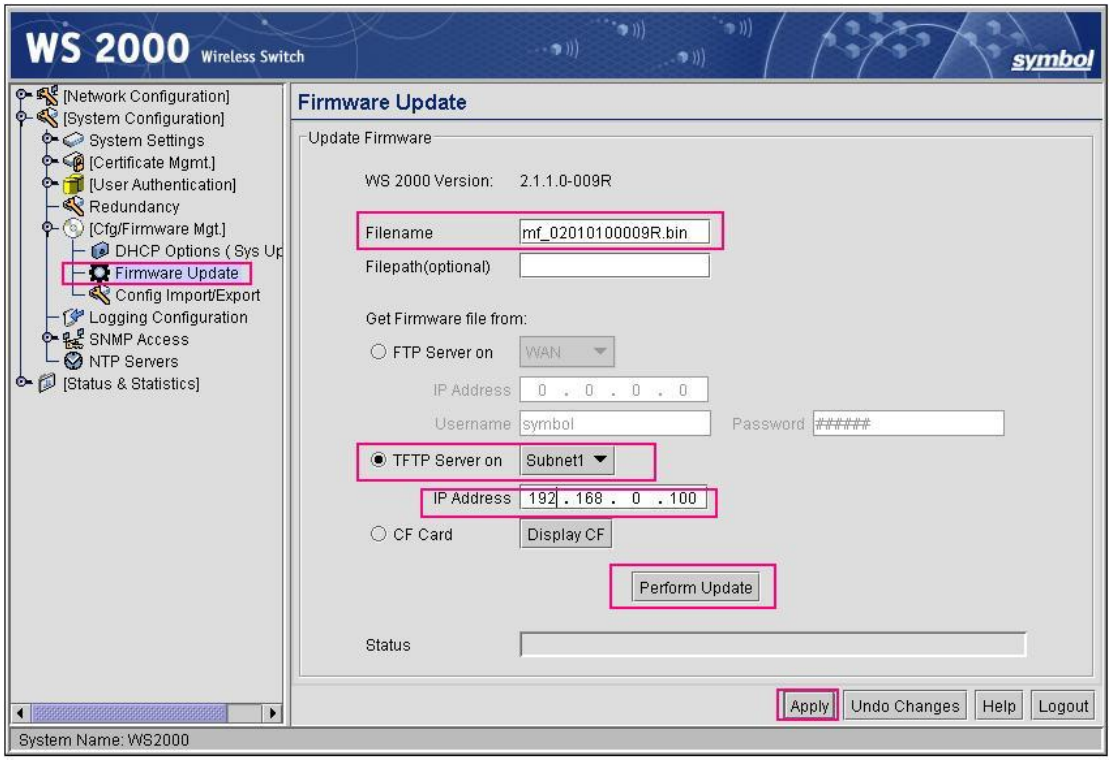
   b. For FTP, issue the following commands.

```
admin>
admin>system
admin(system)>config
admin(system.config)>set server 192.168.0.100
admin(system.config)>set fw file mf_02010100009R.bin
admin(system.config)>set fw path /home/<user>
admin(system.config)>set user <username>
admin(system.config)>set passwd <password>
admin(system.config)>update ftp s1
```

3. The WS 2000 Wireless Switch will reboot and load the firmware.

Installing Firmware through the Web Interface

1. Open the WS 2000 applet by entering the IP address of the wireless switch: http://192.168.0.1
2. From the menu on the left side of the screen, click **Firmware Update**. The **Firmware Update** page will appear.
3. Under **Filename**, enter the firmware file name from the TFTP Server.
4. Click the **TFTP Server on Subnet** option.
5. At **IP Address**, enter the TFTP Server IP address.
6. Click **Apply**.
7. Click **Perform Update**.
8. The WS 2000 Wireless Switch will reboot and load the firmware from the location specified.



Configuring the Wireless Switch from the Default Configuration

Radio settings: The NetLink Wireless Telephones use an 802.11b radio, therefore VIEW Pre-Certification testing was done with the 802.11b mode only and not the b/g mode.

Commands	Default Settings	Required Settings
Beacon-interval	100	100
DTIM-period	10	3
BG mode	B and G	B only
Power level	20 dbm	20 dbm
Channel	1	1
Rates	1, 2, 5.5, 11	1, 2, 5.5, 11
Short preamble	Disabled	Disabled

Configuring Radio Settings through the CLI

To configure radio settings for the wireless switch, use the following commands.

```
admin>
admin>network
admin(network)>ap
admin(network.ap)>
admin(network.ap)>set beacon intvl  1 100
admin(network.ap)>set dtim 1 3
admin(network.ap)>set rate 1 basic 1|2|5.5|11
```

Setting the Channel

Regulatory parameter values depend on country of operation and radio type. Refer to documentation for regulatory product information.

User Selection

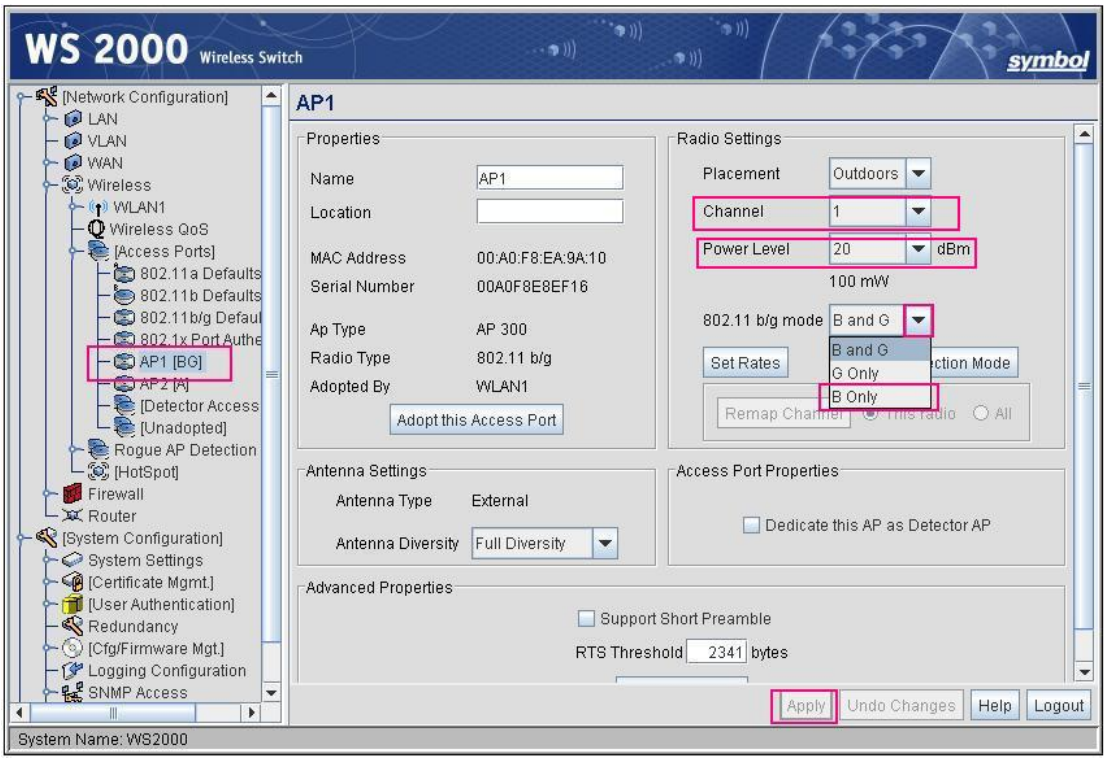
You can specify the desired channel manually by using the following command.

```
admin(network.ap)>set reg 1 in 11 20
```

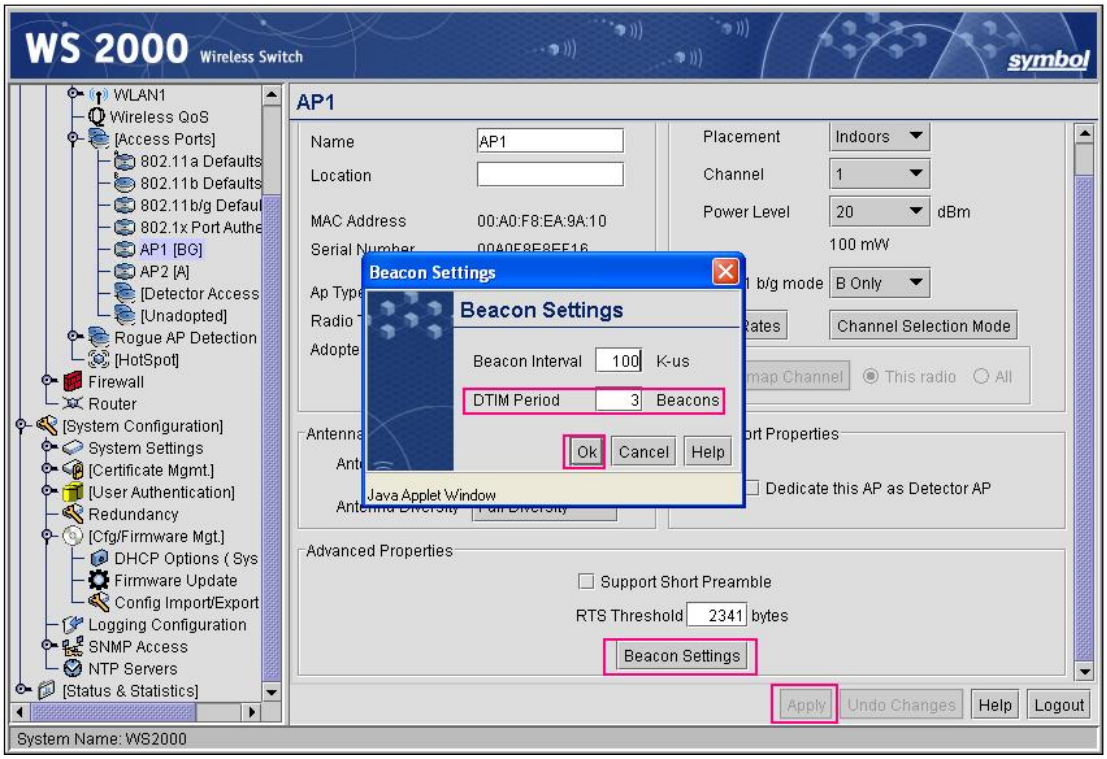
Set reg <access port index> <indoor/outdoor> <channel> <power level>

Configuring Radio Settings through the Web Interface

1. Go to the WS 2000 applet.
2. From the menu on the left side of the page, click **AP1<index> [BG]**.
3. In the **AP1** page, go to **802.11 b/g mode**, and select **B Only** from the dropdown list.
4. Rates will be set automatically to 1, 2, 5.5, 11.
5. From the **Channel** and **Power Level** dropdown lists, select the desired settings. SpectraLink recommends that you use maximum power for best coverage.
6. Click **Apply**.



7. Go to the WS 2000 applet.
8. Click **AP<index> [BG]**.
9. In the **AP1** page, click **Beacon Settings**.
10. In the **Beacon Settings** dialog box, set the **DTIM Period** to **3 Beacons**.
11. Click **OK**.
12. Click **Apply**.



Quality Of Service

In the WS 2000 Wireless Switch, QoS is achieved by prioritizing voice traffic over data traffic. To prioritize voice traffic over data traffic in the Access Port traffic queues, enable voice prioritization in wireless QoS.

Commands	Default Settings	Required settings
Voice prioritization	Enabled	Enabled

Configuring QoS through the CLI

Voice prioritization is enabled by default in the wireless switch.

The following commands show the configuration.

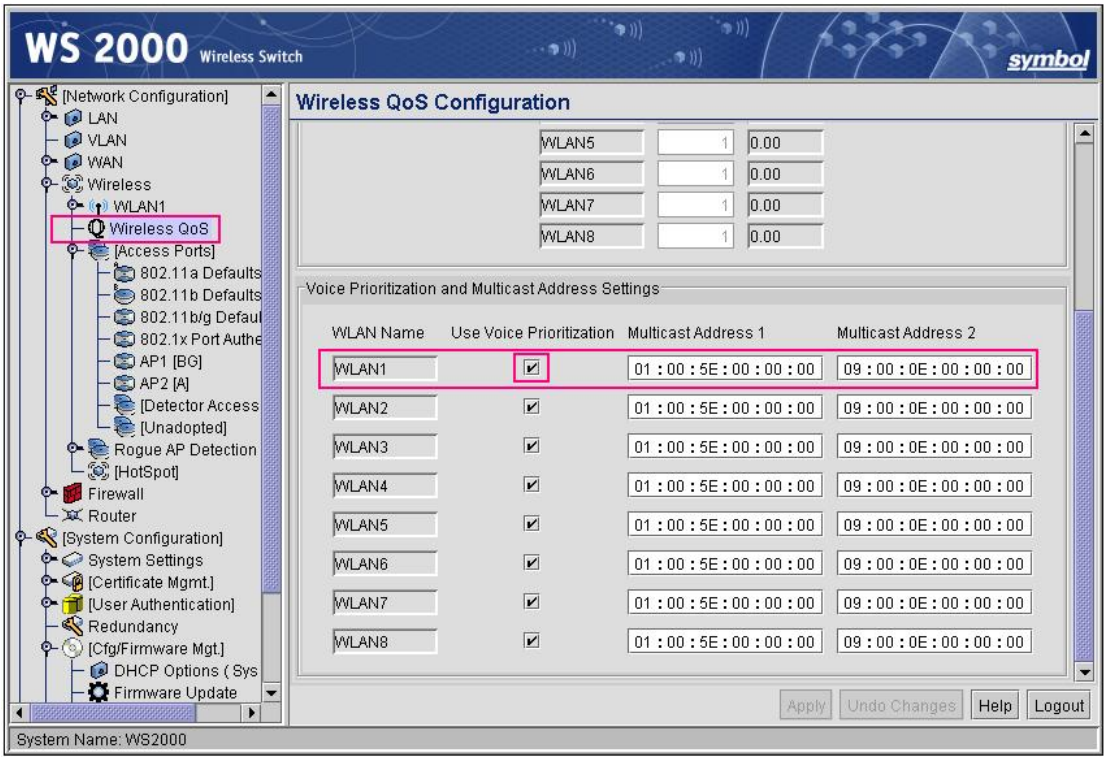
```
admin>
admin>network
admin(network)>wlan
admin(network.wlan)>set vop 1 enable

admin(network.wlan)>show wlan 1

wlan name              : WLAN1
ess identifier         : spectralink
wlan mode              : enable
subnet                 : s1
vlan_id                : 1
enc type               : none
auth type              : none
voice prioritization   : enable
disallow mu to mu      : disable
answer broadcast ess   : disable
secure beacon mode     : disable
default mu acl mode    : allow all
default ap adopt mode  : allow all
multicast address 1    : 01005E000000
multicast address 2    : 09000E000000
```

Configuring QoS through the Web Interface

1. In the WS 2000 applet, click **Wireless QOS**. The **Wireless QoS Configuration** page will appear.
2. **Use Voice Prioritization** is enabled by default.



SSID Settings

Configuring SSID Settings through the CLI

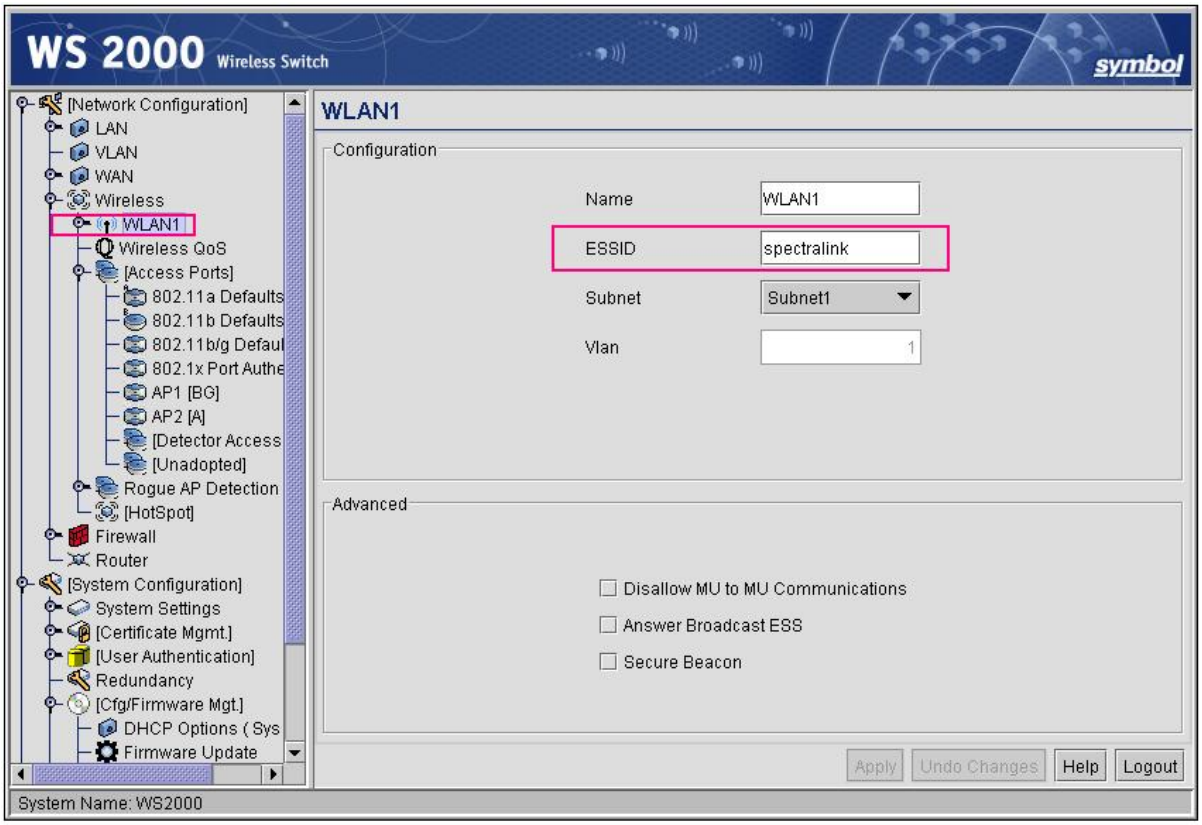
Commands	Default Settings	Required settings
ESSID	101	spectralink

Configure the SSID settings of the wireless switch using the following commands.

```
admin>
admin>network
admin(network)>wlan
admin(network.wlan)>set ess 1 spectralink
```

Configuring SSID Settings through the Web Interface

1. In the WS 2000 applet, under **Wireless**, click **WLAN1**.
2. Configure the ESSID (e.g. spectralink).
3. Click **Apply**.



Security Settings

Enable WPA/WPA2 security mode.

Configuring WPA/WPA2 through the CLI

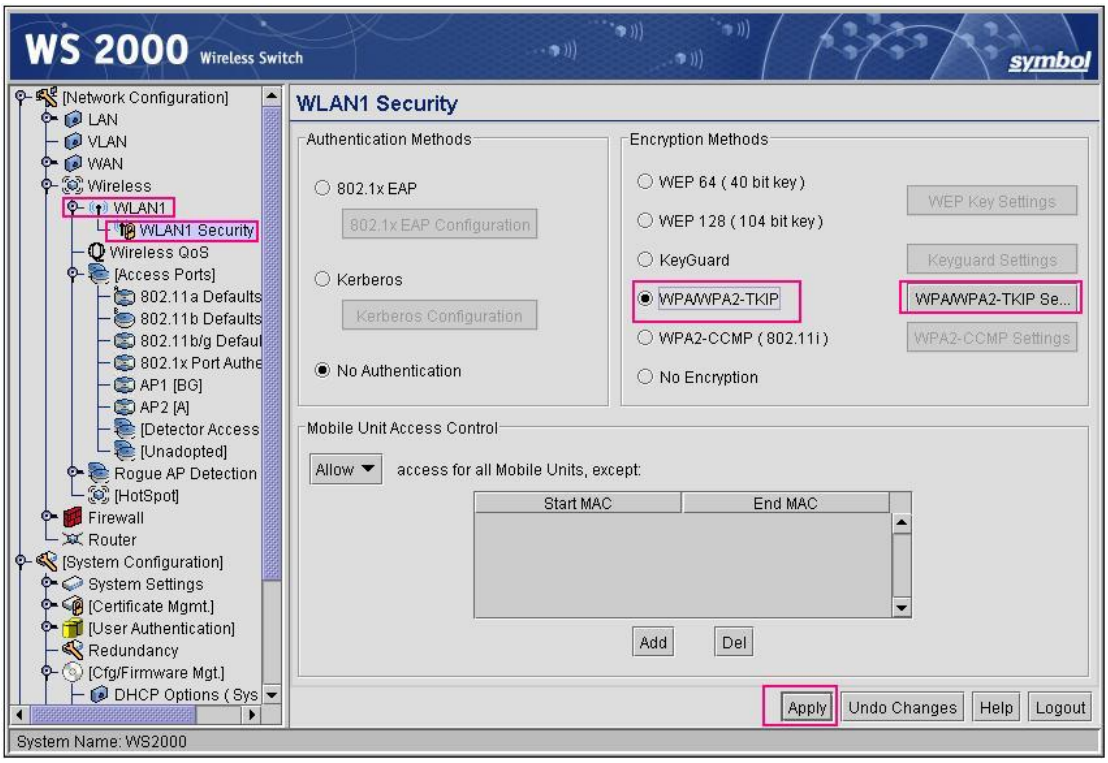
To configure WPA-TKIP (PSK) as security option, use the following commands

```
admin>network
admin(network)>wlan
admin(network.wlan)>set enc 1 tkip
admin(network.wlan)>set tkip phrase 1 12345678
admin(network.wlan)>save
```

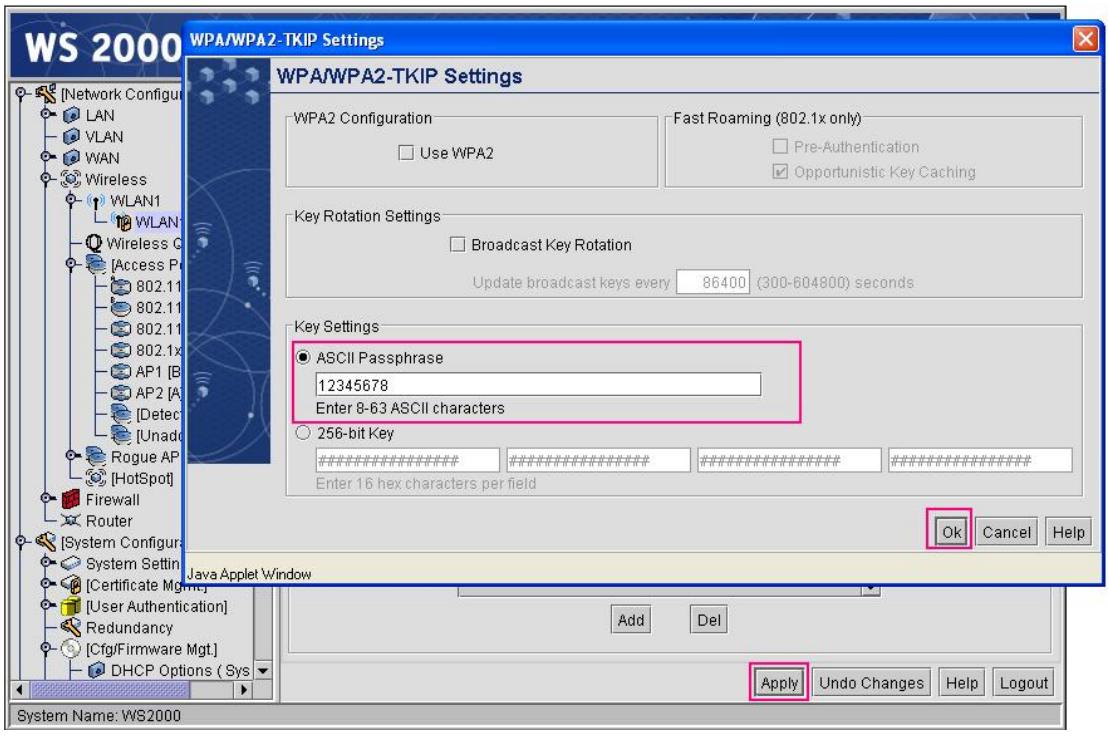
Configuring WPA/WPA2 through the Web Interface

1. In the WS 2000 applet, double-click **WLAN1**, and then click **WLAN1 Security**.
2. Click the **WPA/WPA2-TKIP** option, and click **WPA/WPA2-TKIP Settings**. The **WPA/WPA2-TKIP Settings** dialog box will appear.

The WS 2000 Wireless Switch supports mixed-mode operation of WPA-TKIP and WPA2-TKIP. The steps below enable WPA-TKIP by default. WPA-TKIP was used for VIEW Pre-Certification testing.



3. In the **WPA/WPA2-TKIP Settings** page, under **Key Settings**, click the **ASCII passphrase** option to enter the ASCII passphrase.
4. A warning dialog box will appear while you are trying to enter the key. Click **Yes**.
5. Enter the ASCII passphrase. This will configure the WPA-TKIP (PSK) mode. Click **OK**.
6. Click **Apply**.



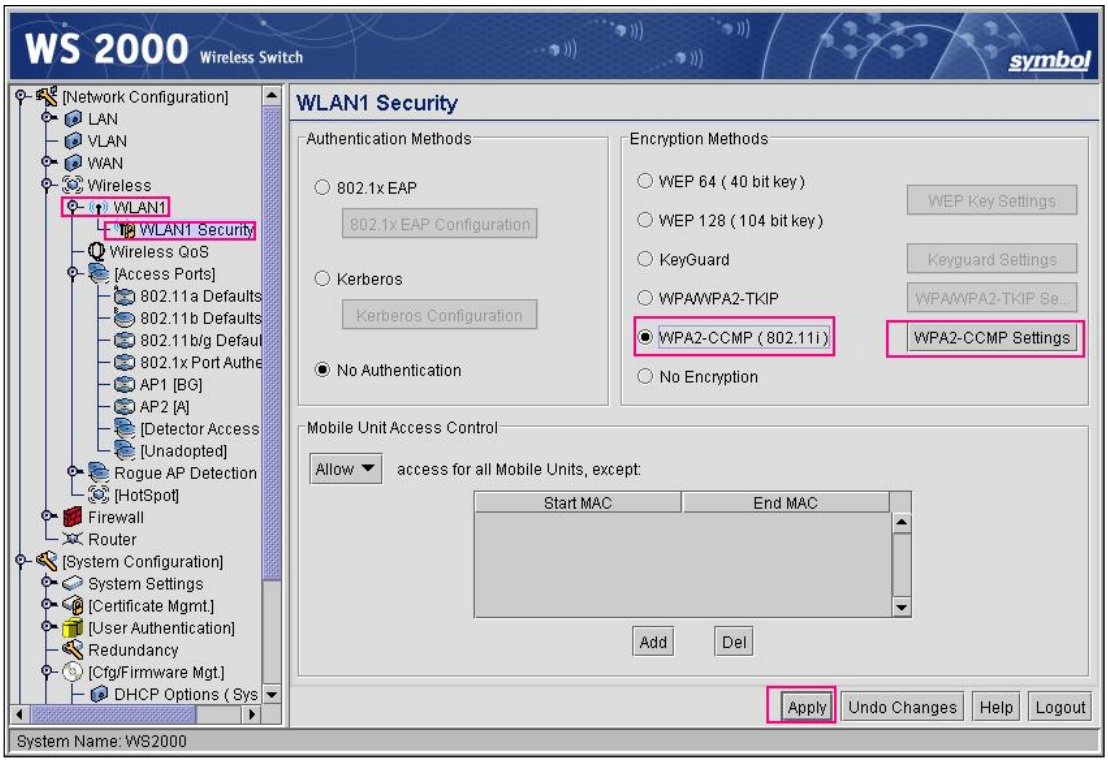
Configuring WPA2-CCMP through the CLI

To configure WPA2-CCMP as a security option, use the following commands.

```
admin>network
admin(network)>wlan
admin(network.wlan)>set enc 1 ccmp
admin(network.wlan)>set ccmp phrase 1 12345678
admin(network.wlan)>save
```

Configuring WPA2-CCMP through the Web Interface

1. In the WS 2000 applet, double-click **WLAN1**, and then click **WLAN1 Security**. The **WLAN1 Security** page will appear.
2. In the **WLAN1 Security** page, click the **WPA2-CCMP (802.11i)** option, and click **WPA2-CCMP Settings**.



3. In the **WPA2-CCMP Settings** dialog box, under **Key Settings**, click the **ASCII passphrase** option to enter the ASCII passphrase.
4. A warning dialog box will appear. Click **Yes**.
5. Enter the ASCII passphrase. Click **OK**.
6. Click **Apply**.